

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Attorney
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Applicant: Naoto Ohashi et al.

Invention: DISPOSABLE DIAPER

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Michelle L. Neal
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PRELIMINARY AMENDMENT

Box: Patent Application
Assistant Commissioner for Patents
Washington, DC 20231

Sir:

Prior to the examination of the above-identified application, please amend the application
as follows:

IN THE SPECIFICATION

Please replace the first full paragraph on page 2 with the following:

It is an object of this invention to provide a disposable diaper designed so that a width
of each groove to be formed on the side of the diaper's topsheet can be enlarged without
reduction in the surface area of the core available to absorb body fluids.

Please replace the paragraph beginning on page 4 and continuing on page 5 with the
following:

a2
Fig. 2 is a sectional view taken along a line II - II in Fig. 1. The core 4 comprises a mixture of fluff pulp fibers 31 and superabsorbent polymer particles 32 entirely wrapped with an absorbent and diffusive sheet 33 such as tissue paper. The core 4 has a thickness t in a transversely middle zone of the crotch region 8. Along each of the grooves 15, the core 4 is depressed in a direction from the topsheet 2 toward the backsheet 3. The groove 15 has its inner surface covered with the topsheet 2 and the absorbent and diffusive sheet 33 directly underlies the topsheet 2. The groove 15 has a bottom 34 and side walls 36. Referring to Fig. 2, d designates a depth of the groove 15 as measured from a body-side surface 37 of the diaper 1 in the vicinity of the groove 15 to the bottom 34, p designates a thickness of the core 4 as measured from the bottom 34 to the backsheet 3 and w designates a width of the groove 15 as measured at the level of the body-side surface 37.

Please replace the paragraph beginning on page 5 and continuing on page 6 with the following:

a3
In such diaper 1, the core 4 preferably has a basis weight of about 200 - 700 g/m², a thickness t of about 2 - 20 mm and contains comminuted pulp at about 98 - 5 % by weight and superabsorbent polymer particles 32 at about 2 - 95 % by weight. A density at which the polymer particles 32 are distributed within the core 4 gradually become higher in the thickness direction of the core 4 from the topsheet 2 toward the backsheet 3. The polymer particles 32 are present also in the vicinity of the bottom 34 as well as in the vicinity of the side walls 36 of the groove 15 and partially joined together with the absorbent and diffusive sheet 33 by means of appropriate adhesive such as hot melt adhesive (not shown). Such joining together may be achieved also by compressing at least one of the core 4 and the absorbent and diffusive sheet 33 in desired regions under wet condition. The absorbent and diffusive sheet 33 is joined to the topsheet 2 over the

a3
cont. bottoms 34 and the side walls 36 by means of adhesive (not shown). The groove 15 preferably has the width w of about 2 - 20 mm, a length L (See Fig. 1) of at least 20mm and the depth d corresponding to about 10 - 90 % of the thickness t of the core 4. The thickness p of the core 4 as measured from the bottom 34 of the groove 15 to the backsheet 3 corresponds to about 10 - 90 % of the thickness t of the core 4.

IN THE CLAIMS

Please amend claim 1 as follows:

1. (Amended) A disposable diaper comprising:

a liquid-pervious topsheet;

a liquid-impervious backsheet;

a liquid-absorbent core covered with an absorbent and diffusive sheet and disposed between said topsheet and said backsheet,

said core being formed on a side facing said topsheet with at least one groove depressed in a direction from a side of said topsheet toward a side of said backsheet, said at least one groove having a bottom and side walls both covered with said topsheet;

said core containing water-absorbent fibers and superabsorbent polymer particles; and

said water-absorbent fibers and superabsorbent polymer particles being partially disposed between said topsheet and said backsheet along said bottom of said at least one groove.

Please amend claim 2 as follows:

sub D1
a5 2. (Amended) The disposable diaper according to Claim 1, wherein said superabsorbent polymer particles are joined integrally with the absorbent and diffusive sheet covering said core along said bottom and side walls of said at least one groove.

Please amend claim 3 as follows:

sub P1
a6 3. (Amended) The disposable diaper according to Claim 1, wherein said absorbent and diffusive sheet is joined to said topsheet along said bottom and side walls of said at least one groove by means of an adhesive.

Please amend claim 4 as follows:

sub B2
a7 4. (Amended) The disposable diaper according to Claim 1, wherein said water-absorbent fibers form a thin layer having a density higher than a density of said water-absorbent fibers around a depth of said core, said thin layer being in close contact with said absorbent and diffusive sheet.

Please amend claim 5 as follows:

sub B3
a8 5. (Amended) The disposable diaper according to Claims 1, wherein said water-absorbent fibers comprise fluff pulp fibers.

Please amend claim 7 as follows:

a9 7. (Amended) The disposable diaper according to Claim 1, wherein said disposable diaper has a front waist region, a rear waist region and a crotch region extending between these two waist regions and wherein said at least one groove extends in a longitudinal direction of said diaper.

Please amend claim 8 as follows:

a10
sub B3 8. (Amended) The disposable diaper according to Claim 7, wherein said at least one groove comprises at least two grooves and said crotch region is formed along a transversely

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cont.
B3
opposite side edge portions thereof with said at least two grooves, respectively, extending in said longitudinal direction in parallel to each other.

Please amend claim 9 as follows:

911
sub D1
9. (Amended) The disposable diaper according to Claim 8, wherein a distribution density of said superabsorbent polymer particles in said core is higher between said at least two grooves extending in parallel to each other than outside said at least two grooves.

IN THE ABSTRACT

Please amend the Abstract as follows:

912
B5
A disposable diaper that is composed of a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core. The core is formed with grooves each depressed in a direction from the side of a topsheet toward the side of a backsheet. The core contains water-absorbent fibers and superabsorbent polymer particles. These fibers and particles are disposed between portions of the topsheet covering bottoms and side walls of the grooves, and portions of the backsheet respectively opposed to the corresponding portions of the topsheet.

... REMARKS ...


By the present Preliminary Amendment, the specification, claims and abstract have been revised to more clearly describe applicants' invention in accordance with the requirements of 35 U.S.C. § 112.

Care has been taken so as to avoid the addition of new matter in the specification, claims and abstract.

Entry of the present Preliminary Amendment prior to the examination of the application is respectfully requested.

In the event applicants have overlooked the need for an extension of time, an additional extension of time, payment of fee, or additional payment of fee, applicants hereby petition therefor and authorize that any charges be made to Deposit Account No. 02-0385, Baker & Daniels.

Respectfully submitted,


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Changes Made to Specification Paragraphs

The first full paragraph on page 2 has been amended as follows:

It is an object of this invention to provide a disposable diaper [improved] designed so that a width of each groove to be formed on the side of the diaper's topsheet can be enlarged without reduction in the surface area of the core available to absorb body fluids.

The paragraph beginning on page 4 and continuing on page 5 has been amended as follows:

Fig. 2 is a sectional view taken along a line II - II in Fig. 1. The core 4 comprises a mixture of fluff pulp fibers 31 and superabsorbent polymer particles 32 entirely wrapped with an absorbent and diffusive sheet 33 such as tissue paper. The core 4 has a thickness t in a transversely middle zone of the crotch region 8. Along each of the grooves 15, the core 4 is depressed in a direction from the topsheet 2 toward the backsheet 3. The groove 15 has its inner surface covered with the topsheet 2 and the absorbent and diffusive sheet 33 directly underlies the topsheet 2. The groove 15 has a bottom 34 and side walls 36. Referring to Fig. 2, d designates a depth of the groove 15 as measured from a body-side surface 37 of the diaper 1 in the vicinity of the groove 15 to the bottom 34, p designates a thickness of the core 4 as measured from the bottom 34 to the backsheet 3 and w designates a width of the groove 15 as measured at the level of the body-side surface 37.

The paragraph beginning on page 5 and continuing on page 6 has been amended as follows:

In such diaper 1, the core 4 preferably has a basis weight of about 200 - 700 g/m², a thickness t of about 2 - 20 mm and contains comminuted pulp [by] at about 98 - 5 % by weight and superabsorbent polymer particles 32 [by] at about 2 - 95 % by weight. A density at which the polymer particles 32 are distributed within the core 4 gradually become higher in the thickness direction of the core 4 from the topsheet 2 toward the backsheet 3. The polymer particles 32 are present also in the vicinity of the bottom 34 as well as in the vicinity of the side walls 36 of the groove 15 and partially joined together with the absorbent and diffusive sheet 33 by means of appropriate adhesive such as hot melt adhesive (not shown). Such joining together may be achieved also by compressing at least one of the core 4 and the absorbent and diffusive sheet 33 in desired regions under wet condition. The absorbent and diffusive sheet 33 is joined to the topsheet 2 over the bottoms 34 and the side walls 36 by means of adhesive (not shown). The groove 15 preferably has the width w of about 2 - 20 mm, a length L (See Fig. 1) of at least 20mm and the depth d corresponding to about 10 - 90 % of the thickness t of the core 4. The thickness p of the core 4 as measured from the bottom 34 of the groove 15 to the backsheet 3 corresponds to about 10 - 90 % of the thickness t of the core 4.

Changes Made to Claims

Claim 1 has been amended as follows:

1. (Amended) A disposable diaper comprising:

a liquid-pervious topsheet;

a liquid-impervious backsheet;

a liquid-absorbent core covered with an absorbent and diffusive sheet and disposed between said topsheet and said backsheet;

said core being formed on a side [of] facing said topsheet with at least one groove

depressed in a direction from a side of said topsheet toward a side of said backsheet, [and] said at least one groove [has] having a bottom and side walls both covered with said topsheet;

said core containing water-absorbent fibers and superabsorbent polymer particles; and

said water-absorbent fibers and superabsorbent polymer particles being partially disposed between said topsheet and said backsheet along said bottom of said at least one groove.

Claim 2 has been amended as follows:

2. (Amended) The disposable diaper according to Claim 1, wherein said superabsorbent polymer particles are joined integrally with the absorbent and diffusive sheet covering said core along said bottom and side walls of said at least one groove.

Claim 3 has been amended as follows:

3. (Amended) The disposable diaper according to Claim 1, wherein said absorbent and diffusive sheet is joined to said topsheet along said bottom and side walls of said at least one groove by means of an adhesive.

Claim 4 has been amended as follows:

4. (Amended) The disposable diaper according to Claim 1, wherein said water-absorbent fibers form a thin layer having a density higher than [that] a density of said water-absorbent fibers around a depth of said core, said thin layer [and] being in close contact with said absorbent and diffusive sheet.

Claim 5 has been amended as follows:

5. (Amended) The disposable diaper according to Claims 1, wherein said water-

absorbent fibers [are] comprise fluff pulp fibers.

Claim 6 remains unchanged.

Claim 7 has been amended as follows:

7. (Amended) The disposable diaper according to Claim 1, wherein said disposable diaper has a front waist region, a rear waist region and a crotch region extending between these two waist regions and wherein said at least one groove extends in a longitudinal direction of said diaper.

Claim 8 has been amended as follows:

8. (Amended) The disposable diaper according to Claim 7, wherein said at least one groove comprises at least two grooves and said crotch region is formed along a transversely opposite side edge portions thereof with said at least two grooves, respectively, extending in said longitudinal direction in parallel to each other.

Claim 9 has been amended as follows:

9. (Amended) The disposable diaper according to Claim 8, wherein a distribution density of said superabsorbent polymer particles in said core is higher between said at least two grooves extending in parallel to each other than outside said at least two grooves.

Changes in the Abstract

The Abstract has been amended as follows:

A disposable diaper that is composed of a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core. The core is formed with grooves each depressed in a direction from the side of a topsheet toward the side of a backsheet. The core contains water-absorbent fibers and superabsorbent polymer particles. These fibers and particles are disposed between portions of the topsheet covering bottoms and side walls of the grooves, and portions of the backsheet respectively opposed to the corresponding portions of the topsheet.

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